



Europäisches Patentamt
European Patent Office
Office européen des brevets

A standard linear barcode is located at the bottom right of the page.

(11) Publication number:

0476631 A1

12

EUROPEAN PATENT APPLICATION

(21) Application number: 91115864-0

⑤1 Int. Cl.⁵: F04C 23/00

(22) Date of filing: 18.09.91

(30) Priority: 21.09.90 JP 252988/90

(43) Date of publication of application:
25.03.92 Bulletin 92/13

(84) Designated Contracting States:
DE FR GB IT

(71) Applicant: **EBARA CORPORATION**
11-1, Haneda Asahi-cho
Ohta-ku Tokyo(JP)

⑦2 Inventor: Niimura, Yasuhiro

c/o Ebara Corporation, 11-1, Haneda
Asahi-cho
Ohta-ku, Tokyo(JP)
Inventor: Saito, Harumitsu
c/o Ebara Corporation, 11-1, Haneda
Asahi-cho
Ohta-ku, Tokyo(JP)

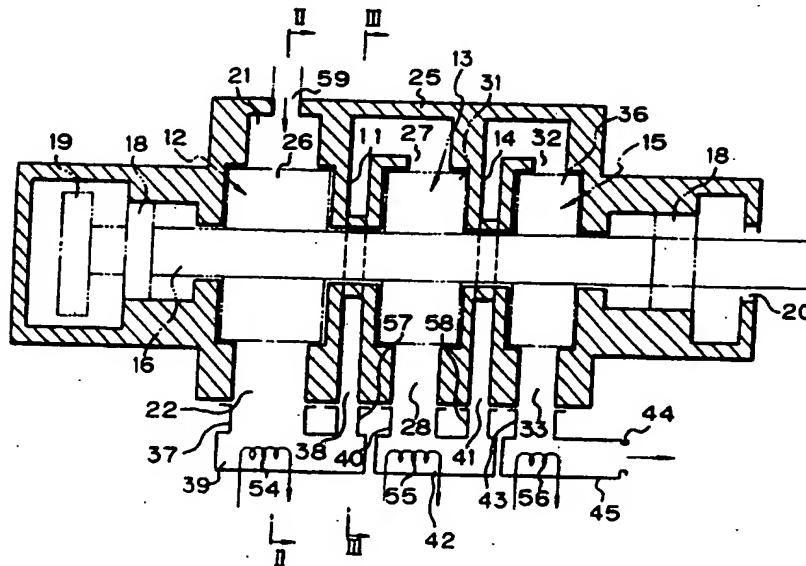
(74) Representative: Wagner, Karl H. et al
**WAGNER & GEYER European Patent
Attorneys Gewürzmühlstrasse 5
W-8000 München 22(DE)**

54 Multistage vacuum pump.

(57) A multistage vacuum pump including a plural set of two lobe type vacuum pumps arranged on a common shaft for rotors and in a common casing. The adjacent pumps are connected in series with each other through a communicating passage formed in a pump casing. A solid material collector

having a cooling means is provided in the communicating passage so that it is dismountable from the pump casing. A solid component in a compressed gas is forcibly produced by and adhered to the solid material collector. Thus, it is not necessary to disassemble the pump casing for cleaning the same.

Fig. 1



hence the solid material collector is not necessarily limited thereto. Thus, as a matter of course, any structure comprising a structure disposed on a communicating passage, having a cooling function and being dismountable from the pump casing may be used.

As described above, according to the present invention, the following advantageous effects will be ensured.

(1) By providing a solid material collector having a cooling means in a communicating passage, so that it is dismountable from the pump casing, a solid component produced within the pump is collected by the solid material collector. Therefore the solid component does not flow into the pump in the next stage, and no solid component will adhere to fine gaps in the rotor part (compression part), and thus a stable operation of the pump and a prolonged lifetime thereof is ensured.

(2) Then, since the solid material collector is dismountable from the pump casing, only the solid material collector can be dismounted for washing without disassembling the pump body.

(3) When the communicating passage on a downstream side of the solid material collector is formed adjacent to a discharge portion of the pump chamber on the front stage, a fluid coming out of the solid material collector passes through the communicating passage and is subjected to heat generated by compression from the discharge portion of the pump chamber on the front stage and the temperature thereof is raised for a perfect vaporization. Therefore, the fluid from the front stage flows into the pump chamber on the next stage in the state free from a solid matter, and hence the pump can be operated stably and its lifetime will be prolonged as well.

5

a pump chamber on the front stage, and a fluid from the front stage flows into a pump chamber on the rear stage by way of said communicating passage.

- 10 3. The multistage vacuum pump claimed in Claim 2, wherein said solid material collector includes a collector housing containing said cooling coil therein, an inlet opening and an outlet opening provided in said collector casing, said inlet opening and said outlet opening are connected to said outlet portion of said pump chamber on the front stage and said communicating passage respectively.
- 15 4. The multistage vacuum pump claimed in Claim 3, wherein said solid material collector includes a coil mounting member fixedly mounting said cooling coil thereon and removably mounted on said collector housing, whereby said coil mounting member is removable from said pump casing without dismounting said collector housing from the same.

20

25

30

35

40

45

50

55

Claims

1. In a multistage vacuum pump including a plural set of two lobe type vacuum pumps arranged on a common shaft for rotors and in a common casing, the adjacent pumps being connected in series with each other through a communicating passage formed in a pump casing; the improvement characterized in that a solid material collector having a cooling means is provided in said communicating passage so that it is dismountable from said pump casing.
2. The multistage vacuum pump claimed in Claim 1, wherein said communicating passage on a downstream side of said solid material collector is formed adjacent to a discharge portion of

Fig. 1

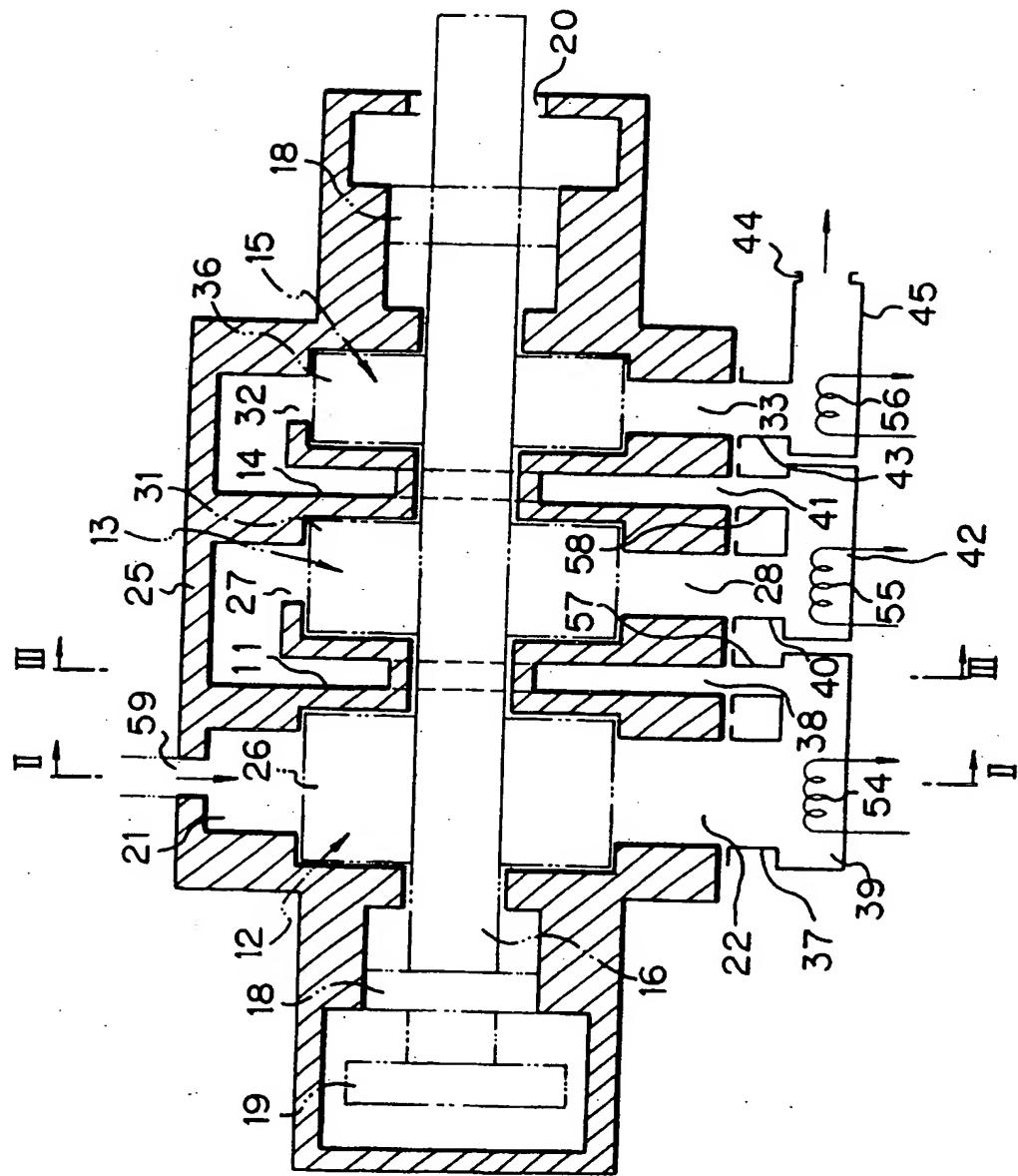


Fig. 2

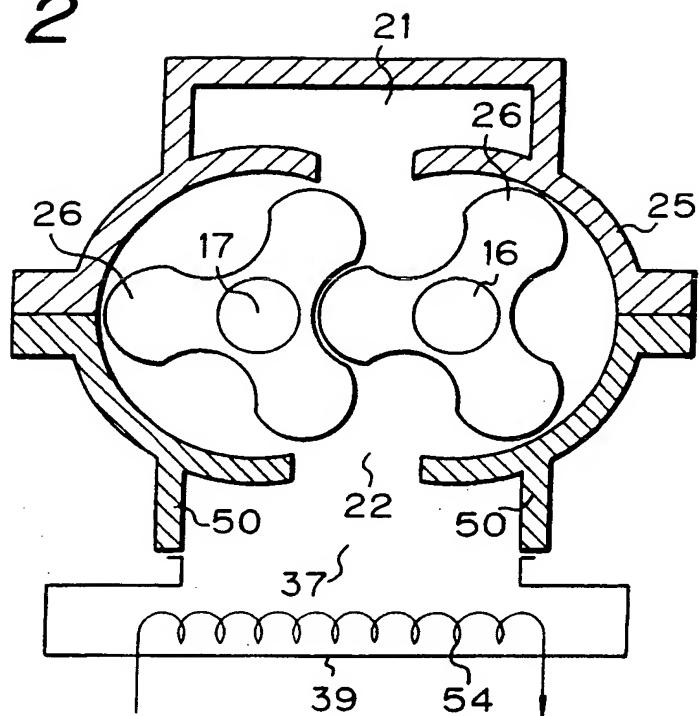


Fig. 3

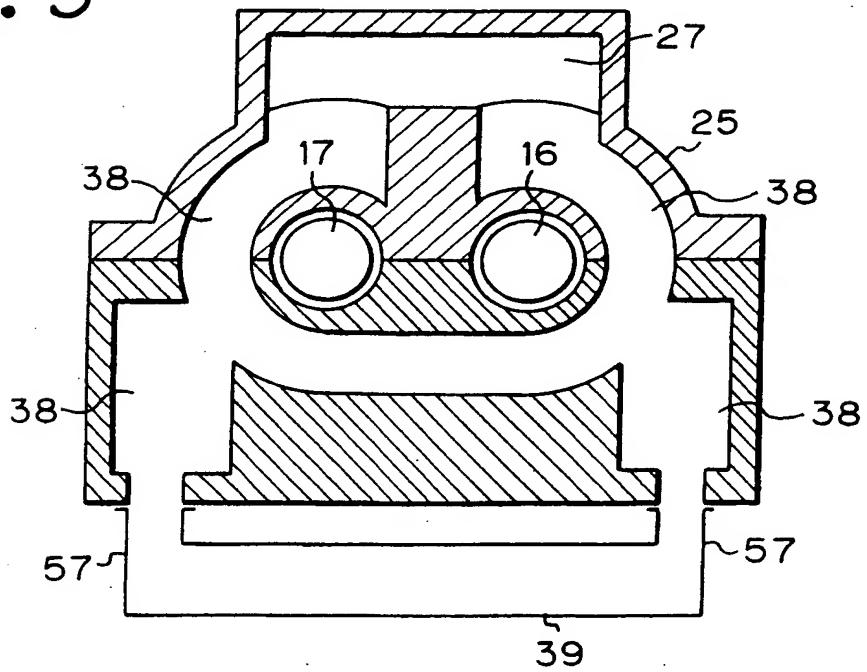


Fig. 4

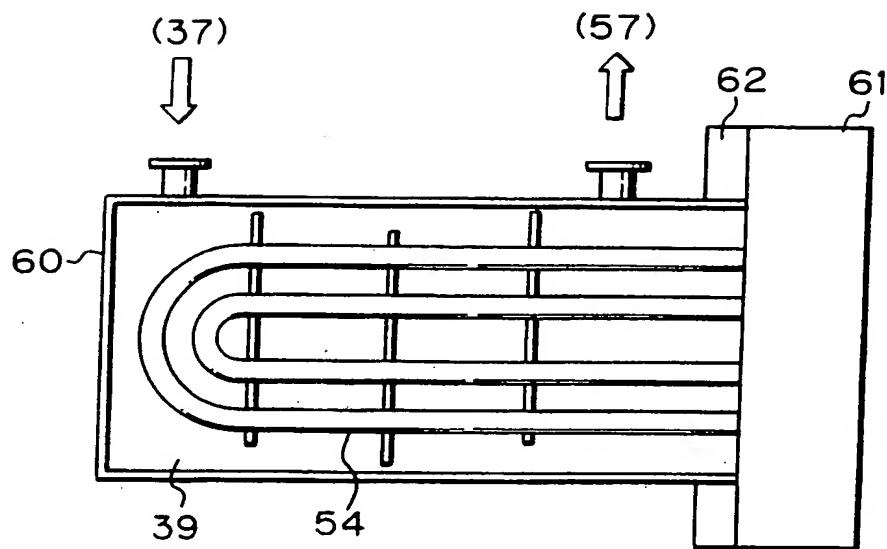


Fig. 5

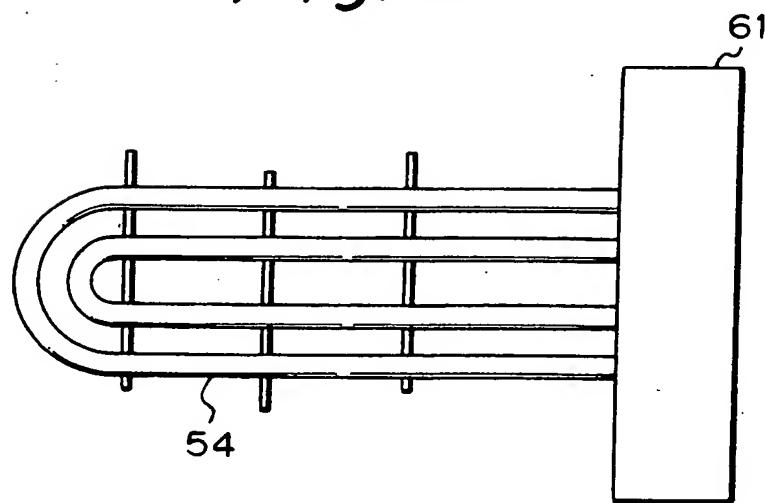
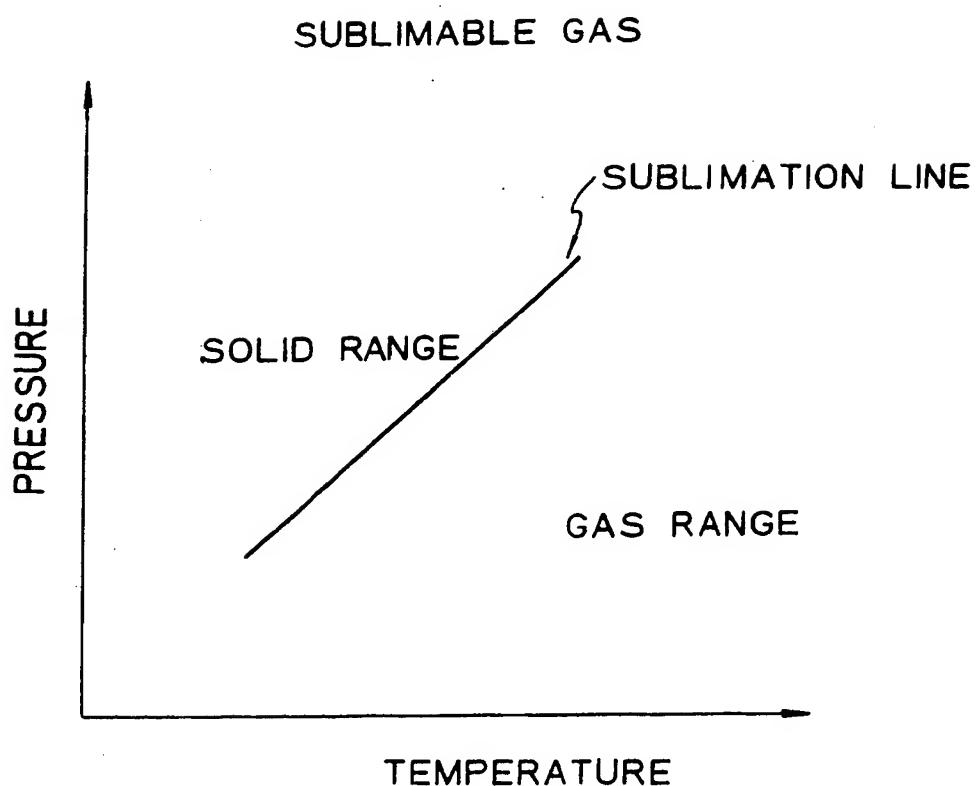


Fig. 6





European
Patent Office

EUROPEAN SEARCH
REPORT

Application Number

EP 91 11 5864

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
E	EP-A-0 448 750 (LEYBOLD) * column 3, line 55 - column 4, line 19; figure 2 **	1-3	F 04 C 23/00
Y	FR-A-2 642 479 (ALCATEL) * figure 1 **	1-3	
Y	PATENT ABSTRACTS OF JAPAN vol. 12, no. 39 (M-665)(2886) 5 February 1988 & JP-A-62 189 388 (EBARA) 19 August 1987 * abstract **	1-3	
Y	EP-A-0 332 741 (LEYBOLD) * column 3, line 55 - column 4, line 15 **	1-3	
A	DE-A-2 056 353 (CLAUDIUS PETERS) * the whole document **	1	
A	EP-A-0 272 767 (UNOZAWA)		

TECHNICAL FIELDS
SEARCHED (Int. Cl.5)

F 04 C

The present search report has been drawn up for all claims

Place of search	Date of completion of search	Examiner
The Hague	20 December 91	LOKERE H.P.
CATEGORY OF CITED DOCUMENTS		
X: particularly relevant if taken alone		E: earlier patent document, but published on, or after the filing date
Y: particularly relevant if combined with another document of the same category		D: document cited in the application
A: technological background		L: document cited for other reasons
O: non-written disclosure		&: member of the same patent family, corresponding document
P: intermediate document		
T: theory or principle underlying the invention		

THIS PAGE BLANK (USPTO)